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THE BRYOLOGIST

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FURTHER NOTES ON CLADONIAS. XIV.

Cladonia digitata, Cladonia deformis and Cladonia bellidiflora.

BRUCE FINK.

In closing this series of papers with the present one, it seems necessary to consider three lichens which are somewhat closely related, have a very similar geographical distribution, and are quite closely related through *Cladonia deformis* to *Cladonia coccifera*, considered in the last paper. While the relation between these two lichens is not close enough to cause any difficulty as a rule, certain conditions may easily be confused, especially when immature. L. Scriba says in a letter, "but *C. deformis* is covered by mealy (farinose) soredia and *C. coccinea pleurota* by granulose soredia." Also, while the first two lichens of the present paper are usually distinct enough, the writer has collected specimens that were very difficult to locate, seeming to occupy a medium place between the two species. *Cladonia bellidiflora* does not grow with the other two usually, and could scarcely be confused with them, but it is very frequently found growing with *Cladonia coccifera*, as the writer found in Washington and in Alberta in the summer of 1906. However, *Cladonia bellidiflora* is quite distinct from *Cladonia coccifera*, and would not be confused with it by one fairly well acquainted with lichens.

There are a number of scarlet-fruited Cladonias that might well receive attention in this series of papers, but they are southern in distribution, for most part, and have not been studied very closely by the writer, nor has more than one of them been submitted to Dr. Wainio. They are *Cladonia leporina*, *Cladonia reticulata* (=*C. Boryi*), *Cladonia papillaria* and *Cladonia Santensis*.

There has been no attempt made in this series of papers to consider all of the North American Cladonias, but the object has been rather to discuss those species which the writer has come in contact with most by collecting and through specimens for determination and on which he has the aid of Dr. Wainio very extensively.

In closing the series, the writer wishes once more to express our very great indebtedness to Dr. Wainio for the aid so freely given to our study of the Cladonias, to L. Scriba, whose European specimens and determinations have also aided greatly, to many persons who have aided by their collecting, to the editor of THE BRYOLOGIST for excellent service, and to those who have aided with photographs.

CLADONIA DIGITATA (Auctt.) Schaer. Lich. Helv. Spic. 22. 1823. Primary thallus persistent or finally dying, composed of lobed or incised, large or medium sized squamules, which are 2–15 mm. long and wide; involute or

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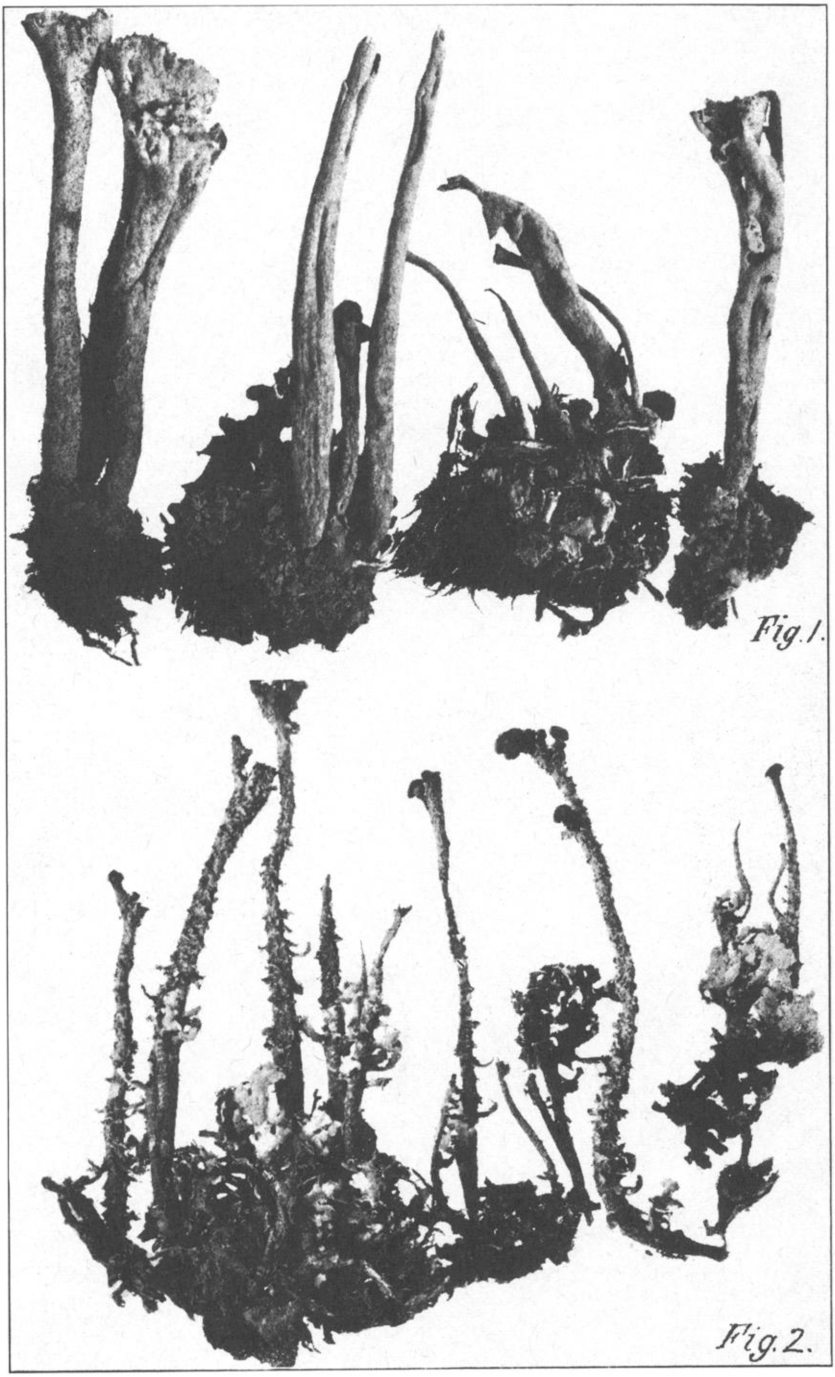

Plate III. Fig. 1. *Cladonia deformis* × 1. Fig. 2. *Cl. bellidiflora* × 1.

somewhat flat; scattered or clustered: sea-green or rarely olivaceous above, white below or dull or yellowish toward the base: sometimes sorediate at the margin and below. Podetia arising from the surface of the primary thallus; rather short but well developed, 10–50 mm. long; the lower part, 0.5–4 mm. in diameter and cylindrical or often incrassate below the cups: erect or decumbent; simple or repeatedly proliferous; the upper part and especially the cups sorediate or the cavity of the cups often corticate; the lower part or sometimes the whole podetium covered with a continuous cortex; without squamules or more or less squamulose, whitish or yellowish-sea-green. Cups medium sized, 3–10 mm. in diameter, 2–5 mm. high; commonly abruptly dilate, regular or irregular; the margin commonly somewhat incurved, subentire, dentate, radiate or proliferate: imperforate. Apothecia medium sized, large or rarely small, 0.5–5 mm. in diameter: at the apices of the branches or rarely on the margin of the cups; simple or clustered; convex or immarginate; scarlet. Hypothecium pale. Hymenium scarlet above, pale red below. Paraphyses simple or rarely branched, somewhat enlarged toward the apex. Asci cylindrico-clavate.

On trunks and decaying wood in forests. Examined by the writer from Minnesota and Alberta (Bruce Fink), White Mountains (W. G. Farlow). Newfoundland (A. C. Waghorne). J. Macoun's catalogue of Canadian plants reeords several localities from British America. The distribution for this species and *Cladonia deformis* is about the same, both American and foreign, both plants being confined to cold regions, but *Cladonia deformis* is by far the more common plant, at least in North America. Besides *Cladonia digitata monstrosa* (Ach.) Wainio Mon. Clad. Univ. 1: 128. 1887, which is the common form and which we will consider the species, the following variety has been noted in North America:

CLADONIA DIGITATA CERUCHOIDES Wainio Mon. Clad. Univ. 1. 133. Podetia at least in part cupless with obtuse or subulate apices.

Dr. Wainio records this variety from Oregon, collected by Dr. Lyall. He also records from three localities in Europe

CLADONIA DEFORMIS (L.) Hoffm. Deutschl. Fl. 120. 1796. Primary thallus usually dying away, when present composed of incised, crenate or lobed, medium sized squamules, 2–7 mm. long and wide; ascending or depressed, flat or somewhat involute or convex: sometimes lacunose; scattered or clustered; sea-green varying toward lighter or reddish, or even light red toward the base; below pale or brownish and sometimes sorediate. Podetia arising from the surface of the primary thallus, 25–85 mm. in length and 1–5 mm. in diameter; subcylindrical or rarely elongate-turbinate, cup-bearing or rarely cupless; erect; partly or entirely and uniformly sorediate, the lower portion usually corticate, the cortex continuous and lacunose, or rimose; the lower portion sometimes squamulose; the corticate portion yellow straw-colored to sea-green, the sorediate part sulphureous or straw-yellow. Cups gradually or abruptly dilated, imperforate, medium sized or small, 3–10 mm. in diameter; the margin subentire, dentate or often irregularly lacerate or proliferate: the proliferations solitary or numerous and their apices minutely cup-bearing or obtuse; from one to three ranks, the lower rank long, the upper ranks and proliferations short; the cavity of the cups usually minutely farinose. Apothecia usually medium sized 0.5–5 mm. in diameter; scattered on the margins of the cups, or clustered at the dilated apices of the proliferations; convex or depressed; commonly having a thin margin; scarlet. Hypothecium pale. Hymenium pale below and pale scarlet above. Paraphyses sometimes branched, not often enlarged or colored toward the apex. Asci cylindrico-clavate. Plate III. Fig. 1.

On earth or rarely on rotting wood, on earth over rocks or in burned woods. Examined by the writer from Maine (Clara E. Cummings), New Hampshire (W. G. Farlow, Clara E. Cummings, G. K. Merrill, and ·Miss Cumming's specimen was a rather immature one referred to *Cladonia cornucopioides pleurota* in L. B. A.), Minnesota, Washington and Alberta (Bruce Fink), Wyoming (Aven Nelson), Montana (L. H. Pammel), Newfoundland (A. C. Waghorne), Alaska (Wm. Trelease), Canada (J. Macoun). C. H. Peck records from New York, and J. Macoun adds many localities in British America in his catalogue. Thus the distribution is throughout the northern United States and British America and southward in the mountains. Found in all the grand divisions.

CLADONIA BELLIDIFLORA (Ach.) Schaer. Lich. Helv. Spic. 21, 1823. Primary thallus finally disappearing or rarely persistent, composed of laciniate or incised crenate, medium sized or small squamules, which are 2–5 mm. in length and 0.5–1 mm. in width: ascending or nearly erect: nearly flat or somewhat involute; scattered or clustered; sea-green varying toward straw-colored, yellowish or whitish above and white below, or varying toward yellowish or brownish toward the base of the squamules; without soredia. Pedetia arising from the squamules of the primary thallus or from those at the base of old podetià, or even as branches of old podetia; commonly elongated, 20–75 mm. in length and 0.5–5 mm. in diameter, subcylindrical or tubaeform, cup-bearing or without cups and subulate; ranks usually 1–3, the lowest and sometimes all of them elongated; sometimes branched: sides sometimes perforate; clustered or scattered; erect (with erect branches if present) or decumbent curved or flexuous; corticate and without soredia, the cortex smooth or verrucose, continuous to dispersed-areolate, or partly decorticate; more or less squamulose; corticate portions sea green, varying toward yellow, straw-colored or whitish, the decorticate portions whitish or straw-colored. Cups small, about 2–7 mm. in diameter; abruptly dilated, or scarcely wider than the tops of the podetia; quite regular or oblique; the margin subentire or dentate, or rarely proliferate with one to several proliferation from the margin of the cup or rarely from the centre. Apothecia small or medium sized, about 0.5–4 mm. in diameter; clustered or conglomerate on the apex of the somewhat dilated podetium or on the margin of the cup: at first flat and thinly margined, but soon becoming convex and immarginate (?), often becoming irregular and perforate; scarlet. Hypothecium pale or cloudy. Hymenium pale below and reddish above. Paraphyses usually simple and but little thickened toward the apex. Asci clavate or cylindrico-clavate. Plate III. Fig. 2.

On earth or on earth over rocks, especially in high and open places. Examined by the writer from Washington and Alberta (Bruce Fink), Vancouver Island (J. Macoun), Alaska (Trevor Kincaid). J. Macoun records from quite a number of localities throughout British America, Clara E. Cummings from many localities in Alaska, and Dr. Wainio adds California. This gives a general distribution throughout British America and Alaska, and from two states on the Pacific coast. This is the form *coccocephala* (Ach.) Wainio Mon. Clad. Univ. 1: 204. 1894, which is found in Europe, Asia and South America.

CLADONIA BELLIDIFLORA Hookeri (Tuck.) Nyl. Syn. Lich. 221. 1860 Podetia elongated, cup-bearing, destitute of squamules (or finally sparsely squamulose).

Recorded from Newfoundland and western arctic America by Dr. Wainio, and Clara E. Cummings reports it from several localities in her Lichens of Alaska. Known also in Europe, Asia and South America.

CLADONIA BELLIDIFLORA RAMULOSA Wainio Mon. Clad. Univ. 2: 210, 1894. Podetia quite short, about 10-20 mm. long and 0.7-2 mm in diameter, cupless and apices quite obtuse, radiately, fasciculately or dichotomously branched at or near the apex, with divaricate and quite short branches; destitute of squamules or sparsely squamulose.

Recorded from Finland by Dr. Wainio and from Alaska by Clara E. Cummings. Of this plant Dr. Wainio says, "Habitu subsimilis est *Cl. cristatellae* Tuck., sed sine dubio e *Cl. bellidiflora* est evolute."

The illustration of *Cladonia deformis* is from No. 66, "Lichenes Boreali-Americani," and that for *Cladonia bellidiflora* is from a collection made by the writer at Glacier, British Columbia.

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Concluded.

NOTES ON NOMENCLATURE IX.

ELIZABETH G. BRITTON.

Part 229 of Brotherus' Mosses in Engler and Prantl Pflanzenfamilien was received on October 25th, 1907. It includes pages 961-1008, completes the *Hookeriaceae* and takes up the *Hypopterygiaceae*, *Helicophyllaceae*, *Rhacopilaceae* and *Leskeaceae*.

All but the last are tropical or subtropical in their distribution with one remarkable exception: *Hypopterygium Canadense* Kindb., from Queen Charlotte Island, British Columbia, is the only representative of this genus further north than Mexico or Cuba. Through the kindness of Professor Macoun, I have recently seen the type specimens and they undoubtedly belong to this tropical genus. It is one of those anomalous cases of distribution which finds its parallel at Killarney, Ireland, where a filmy fern and one of the *Hookeriaceae*, *Cyclodictyon lœtevirens*, are unique examples. This may be a survival of a tropical flora extending northward to the Yukon. *Rhacopilum tomentosum* is known to occur in Louisiana and will probably be discovered in some other of our Southern States. It ranges throughout the West Indies also.